

ORIGINAL  
RECEIVED

AUG 18 1995

Before the  
**FEDERAL COMMUNICATIONS COMMISSION**  
Washington, D.C. 20554

FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF SECRETARY

In the Matter of

Replacement of Part 90 by Part 88  
to Revise the Private Land Mobile  
Radio Services and Modify the  
Policies Governing Them

and

PR Docket No. 92-235

Examination of Exclusivity and  
Frequency Assignment Policies  
of the Private Land Mobile Radio  
Services

DOCKET FILE COPY ORIGINAL

To: The Commission

**PETITION FOR RECONSIDERATION**

**SECURICOR RADIOCOMS LIMITED and  
LINEAR MODULATION TECHNOLOGY  
LIMITED**

Robert B. Kelly  
W. Ashby Beal, Jr.

KELLY & POVICH, P.C.  
Suite 300  
1101 30th Street, N.W.  
Washington, D.C. 20007  
(202) 342-0460

Technical Consultant:  
Roger Madden  
ROGER MADDEN COMPANY  
3580 Plum Dale Dr.  
Fairfax, VA 22033  
(703) 787-8251

THEIR COUNSEL

August 18, 1995

No. of Copies rec'd  
List ABCDE

2411

## SUMMARY

Securicor Radiocom Limited and Linear Modulation Technology Limited (collectively, "Securicor") hereby petition the Commission to reconsider its Report and Order and Further Notice of Proposed Rule Making, FCC 95-255 (June 23, 1995) ("R&O" and "FNPRM"). In particular, Securicor requests the FCC to modify the band channelization plans adopted in the R&O and to refarm the 150-174 MHz and 421-512 MHz Private Land Mobile Radio bands employing a 5 kHz channelization plan. Securicor further requests that the Commission modify certain of the technical rules adopted by the R&O to better accommodate the introduction of highly spectrally-efficient technologies in the PLMR bands below 512 MHz.

Securicor is a leading developer of the highly-spectrally efficient Linear Modulation technology. The 5 kHz LM systems currently being deployed in the 220 MHz band represent the current state-of-the-art in spectrally-efficient technology. The 5 kHz Securicor LM system can carry analog speech, digital "plain" or encrypted speech and data files that could contain various graphic formats, including color pictures and even slow-scan video. The LM speech quality exceeds that provided by a 12.5 kHz Frequency Modulation, or "FM," system. The LM data rate in a 5 kHz channel is currently offered at 14.4 kb/s with performance equalling that of a toll quality telephone circuit. The LM systems will operate well in a mixed-modulation environment, and indeed, will permit greater frequency reuse than available from FM technologies.

Securicor appreciates the difficult tasks confronted by the Commission in resolving a number of highly technical and contentious issues in the R&O. We believe, however, that the technical choices and trade-offs made in the R&O simply will not achieve the policy goals set by the Commission for this Docket.

The trade-offs made by the R&O band plans come at a high price. A Hatfield Associates, Inc. ("Hatfield") study of the economic impact of the R&O concludes that the decision to channelize with 7.5 kHz spacings in the VHF band and 6.25 kHz spacings in the UHF band instead of 5 kHz will cost up to \$7.6 billion in Federal revenues foregone if valued at the prices bid for spectrum at the IVDS and narrowband PCS auctions as suggested in the FNPRM. Hatfield further concludes that the failure to employ 5 kHz channelization will cost up to 8,800 full time service jobs, 26,500 year-long manufacturing jobs and will reduce capacity in the PLMR bands below 512 MHz by up to 3.6 million users. Securicor believes that the R&O's failure to address these costs of foregone capacity is a product of a stale and incomplete record that does not adequately reflect significant intervening events since the close of the Comment cycle almost two years prior to the adoption of the Rules.

The R&O's band plans appear largely premised upon the decision to establish "technology-neutrality" in the refarmed PLMR Bands. In order to achieve that neutrality, the FCC has used as its baseline for refarming something other than the current state-of-the-art in spectrum efficiency. In practice,

the R&O's band plans erase a key economy of 5 kHz technologies, i.e., their spectrum efficiency, and thus in effect are not technology-neutral.

In Securicor's view, the FCC's refarming rules should establish a level playing field for manufacturers. In other words, the FCC's rules should level the playing field, but not the technologies playing on the field. The technology-neutrality sought by the R&O must not be construed to abdicate the fundamental mandate of the Communications Act to promote the efficient use of the radio spectrum.

Securicor thus respectfully urges the FCC on reconsideration to adopt 5 kHz channelization plans for the refarmed PLMR bands. These plans will employ the current state-of-the-art in spectrum efficiency to maximize current capacity and ease the transition of the users in the bands to advanced technologies. The 5 kHz band plans may be implemented on-channel if desired, and will accommodate wideband equivalent technologies through aggregation.

Securicor further urges the FCC to reconsider its views with respect to the ten year spectrum efficiency standards and to adopt a ten year standard or equivalent of 2.5 kHz and 7.2 kb/s per channel. It is essential to fulfilling the objectives of the refarming proceeding that the FCC provide equipment manufacturers the proper signals and incentives to continue investing in needed research and development. The ten year standard established in the R&O will spur almost no investment by manufacturers in

research and development activity. As a result, the expenditures of R&D funds with respect to the U.S. PLMR bands are likely to lag behind expenditures in other markets, and, in turn, U.S. competitiveness in global markets may well be impaired.

Finally, Securicor requests that the FCC modify certain of the technical rules adopted in the R&O to better accommodate advanced technologies. To this end, "in-channel" restrictions on usage should be eliminated to allow advanced technologies to maximize communications capacity for the users' benefit. Out-of-band emissions instead should be regulated through adjacent channel interference ratio criteria.

## TABLE OF CONTENTS

### SUMMARY

I.	INTRODUCTION . . . . .	2
II.	STATEMENT OF INTEREST . . . . .	3
	A. Linear Modulation Technology . . . . .	4
	B. Refarming of the PLMR Bands . . . . .	7
III.	THE R&O'S BAND PLANS DO NOT MAXIMIZE SPECTRUM EFFICIENCY. . . . .	9
	A. The R&O Disfavors the Most Spectrally- Efficient Technologies . . . . .	10
	B. Technology Neutrality Must Not Override the Requirements of the Communications Act. . . . .	14
	C. The R&O Is Not Technology Neutral . . . . .	14
	D. The R&O's Findings Regarding a 5 kHz Band Plan Are Flawed and Erroneous . . . . .	15
IV.	A 5 kHz BAND PLAN WILL PROVIDE A SMOOTH TRANSITION TO ADVANCED TECHNOLOGIES IN THE PLMR BANDS . . . . .	18
V.	THE R&O'S BAND PLANS IMPOSE SUBSTANTIAL COSTS . . . . .	30
VI.	THE R&O IS BASED UPON A STALE RECORD . . . . .	32
VII.	TECHNICAL ISSUES . . . . .	34
	A. In-Channel Restrictions . . . . .	34
	B. Emissions Mask . . . . .	35
	C. Two Frequency Operation in the VHF Band . . . . .	36
VIII.	CONCLUSION . . . . .	37

### APPENDIX

RECEIVED

AUG 18 1995

Before the  
**FEDERAL COMMUNICATIONS COMMISSION**  
Washington, D.C. 20554

FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF SECRETARY

In the Matter of )  
 )  
Replacement of Part 90 by Part 88 )  
to Revise the Private Land Mobile )  
Radio Services and Modify the )  
Policies Governing Them )

and

PR Docket No. 92-235

Examination of Exclusivity and  
Frequency Assignment Policies  
of the Private Land Mobile Radio  
Services

To: The Commission

**PETITION FOR RECONSIDERATION**

Securicor Radiocom Limited and Linear Modulation Technology Limited (collectively referred to as "Securicor")<sup>1</sup>, by counsel and pursuant to Section 1.429 of the FCC's Rules, 47 C.F.R. §1.429, hereby petition the Commission to reconsider its Report and Order and Further Notice of Proposed Rule Making, FCC 95-255 (June 23, 1995)<sup>2</sup> ("R&O" and "FNPRM") in the above-captioned proceeding. In particular, Securicor herein respectfully urges the FCC to reconsider the band plans adopted by the R&O to refarm the 150-174 MHz and 421-512 MHz Bands and, instead, to adopt a 5 kHz channelization plan for those Bands.

---

<sup>1</sup>Formerly, Securicor PMR Systems Limited.

<sup>2</sup>Replacement of Part 90 by Part 88 to Revise the Private Land Mobile Radio Services and Modify the Policies Governing Them, 60 Fed. Reg. 37152 (July 19, 1995).

## I. INTRODUCTION

Following a lengthy and complex debate begun over four years ago in Docket 91-170, in its R&O the Commission has adopted rules to govern the "refarming" of the PLMR bands below 512 MHz.<sup>3</sup> These rules will govern the migration of the PLMR bands to more efficient technologies and to provide additional PLMR channel capacity needed to relieve the existing severe congestion of these bands in many areas throughout the nation. To this end, the R&O seeks to attain as its major policy goals: (1) technical flexibility, (2) a robust competitive marketplace, (3) rules which enable users to make equipment investment decisions that best satisfy their business needs, and (4) spectrum efficiency. R&O at paras. 2-3.

To implement these policy goals, the R&O has adopted numerous technical decisions, including among them, the implementation of 7.5 kHz channel spacings in the VHF Band (with 6.25 kHz channel bandwidth) and 6.25 kHz channel spacings (and bandwidth) in the UHF Bands. The FCC has also provided that 12.5 kHz technology may be licensed in the VHF and UHF Bands as an interim measure to the migration to Narrowband ("NB") technology. In addition, the Commission has elected to manage the migration of the PLMR Bands below 512 MHz to advanced technologies through

---

<sup>3</sup>The bands subject to the refarming rules established by the R&O are the 150-174 MHz band (the "VHF Band") and the 421-430, 450-470 and 470-512 MHz Bands (the "UHF Bands"). In the R&O (at para. 24), the FCC elected not to pursue at this time the refarming of the 72-76 MHz band.

the type acceptance process, rather than to require existing licensees to change out their systems by a date certain. The FCC, however, will address the incentives to be provided licensees to migrate to more spectrally-efficient technologies through the FNPRM.

## **II. STATEMENT OF INTEREST**

From the earliest days of this Docket and its predecessor, PR Docket 91-170, Securicor has been a strong proponent of the adoption of rules to promote the refarming of the PLMR Bands at issue with spectrally-efficient technologies.<sup>4</sup> We share the FCC's belief that the development of a robustly competitive equipment marketplace will enhance the product options and service choices available to users in the refarmed PLMR Bands, and we are strongly committed to continuing efforts to bringing the benefits of Linear Modulation, or "LM" technology to the marketplace.

---

<sup>4</sup>Securicor's initial Comments in this Docket advocated the channelization of all PLMR Bands below 512 MHz in 5 kHz increments. See Comments of Securicor PMR Systems Ltd., PR Docket No. 92-235 (May 28, 1993) at 7. After further development of the LM technology, on April 20, 1995 Securicor in an Ex Parte submission to the Docket endorsed the use of a 2.5 kHz band plan in the refarmed bands. See Ex Parte Submission of Securicor Linear Modulation Technology Limited, PR Docket No. 92-235 (April 20, 1995) at 1.

## **A. Linear Modulation Technology**

Securicor is a leading developer of the highly-spectrally efficient LM technology.<sup>5</sup> The 5 kHz LM systems currently being deployed in the 220 MHz band represent the current state-of-the-art in spectrally-efficient technology. To Securicor's best knowledge, there are no systems currently in commercial deployment in private land mobile usage anywhere in the world that provide a greater level of spectrum efficiency.

The 5 kHz Securicor LM system can carry analog speech, digital "plain" or encrypted speech and data files that could contain various graphic formats, including color pictures and even slow-scan video. The LM speech quality exceeds that provided by a 12.5 kHz Frequency Modulation, or "FM," system. The LM data rate in a 5 kHz channel is currently offered at 14.4 kb/s with performance equalling that of a toll quality telephone

---

<sup>5</sup> Securicor, LMT and TeleSciences are subsidiaries of Securicor Group plc ("Securicor Group"), a corporation chartered under the laws of the United Kingdom. Among other ventures, the Securicor Group provides security services, parcel delivery services, communications services, and business services throughout the United Kingdom and, increasingly, Europe and other world markets. Among the Securicor Group's communications businesses, Securicor Communications Ltd. is a partner (with British Telecommunications plc) in Cellnet which serves a large and growing cellular customer base throughout the U.K. Securicor Telecoms supplies office-based telephone key systems and PBXs. Securicor Datatrak provides advanced fleet management and vehicle location systems and has recently brought to market a fully-integrated command and information system.

circuit. In addition, we plan to offer 5 kHz systems with an adaptive data rate of up to 19.2 kb/s.<sup>6</sup>

LM, in addition, provides frequency coordinators and RF system planners with great flexibility in configuring systems, through the use of powerful refarming tools inherent within the technology. The LM systems will operate well in a mixed-modulation environment, and indeed, will permit greater frequency reuse than available from FM technologies. LM systems will cause less interference to an FM system than FM systems will cause to FM systems. For example, the distance between two LM co-channel systems may be only 79% that of the distance between two co-channel FM systems. LM, in addition, will produce an enhanced ability to "offset" channels to obtain even greater frequency reuse than available from FM technology. LM, however, is technically compatible with 12.5 kHz FM systems and will provide comparable system coverage to FM systems at a much lower average transmitted power. An additional benefit is that because of the lower transmit power, LM uses less electrical power to operate than conventional speech FM systems.

As noted in Securicor's May 16, 1995 Ex Parte filing in this Docket, the Radiocommunications Agency ("RA") in the U.K. currently is encouraging private land mobile users to migrate to

---

<sup>6</sup>The Securicor LM system technology was described by Peter Hilton, Managing Director of Securicor, during the FCC's May 6, 1993 roundtable discussion on the refarming initiative in this Docket 92-235. See Comments of Securicor PMR Systems Limited on Notice of Proposed Rule Making, PR Docket No. 92-235 (May 28, 1993).

5 kHz systems by offering a 50% discount from the license fees currently imposed on U.K. private land mobile licensees. That is the maximum discount that the RA is authorized by statute to provide.

The FCC's leadership in promoting the deployment of spectrally-efficient 5 kHz technologies in the U.S. through the allocation of the 220-222 MHz band in 5 kHz channels to PLMR uses<sup>7</sup> and the Commission's proposal in the Notice of Proposed Rule Making in this Docket to channelize the 72-76 MHz and 150-174 MHz bands with 5 kHz channels<sup>8</sup> spurred Securicor to undertake an ambitious program to work with U.S. partners to develop and distribute LM equipment in the U.S.<sup>9</sup> In this respect, we have both acquired a minority interest in, and entered into licensing and technology transfer agreements with, E.F. Johnson Co.

With these partnerships, Securicor has equipped over 1500 channels in the 220 MHz Band with 5 kHz LM equipment, and anticipates equipping an additional 2500 channels by the December 31, 1995 construction deadline for the non-nationwide 220 MHz systems. For this, we have called upon the capabilities of

---

<sup>7</sup>Amendment of Part 90 of the Commission's Rules to Provide for the use of the 220-222 MHz Band by the Private Land Mobile Radio Services, 6 FCC Rcd 2356 (1991), recon., 7 FCC Rcd 4484 (1992).

<sup>8</sup>Replacement of Part 90 by Part 88 to Revise the Private Land Mobile Radio Services and Modify the Policies Governing Them (Notice of Proposed Rule Making), 7 FCC Rcd 8105 (1992).

<sup>9</sup> Securicor received type acceptance for its 220 MHz LM system on March 7, 1994.

Securicor TeleSciences, Inc. ("TeleSciences"), our wholly-owned U.S. subsidiary headquartered in Moorestown, New Jersey, to play a key role in the manufacturing, assembly, testing and distribution of the Securicor LM 220 MHz systems in the U.S..

Securicor is continuing its work in further developing LM technology to deploy ever more spectrally-efficient technologies. While we believe that traditional FM technology may find its limit in 12.5 kHz technology, we do not yet see any such limit for LM technology. In short, we believe that LM is precisely the type of advanced, spectrally-efficient technology that will bring to the market the benefits sought by the FCC in refarming the PLMR bands.

#### **B. Refarming of the PLMR Bands**

Securicor appreciates the difficult tasks confronted by the Commission in sifting through the record in this Docket to resolve a number of highly technical and contentious issues. We further appreciate the opportunity to have contributed to the record here and recognize that we must continue to work constructively with the FCC and industry as we bring our technology to market in the PLMR bands.

We believe, however, that the technical choices and trade-offs made in the R&O simply will not achieve the policy goals set by the Commission for this Docket. The R&O's band plans appear largely premised upon the decision to establish "technology-neutrality" in the refarmed PLMR Bands. In order to achieve that neutrality, the FCC has used as its baseline for

refarming something other than the current state-of-the-art in spectrum efficiency. In adopting this baseline, the refarming rules trade-off and compromise significant efficiencies that may be captured by more efficient technologies, including LM, and, accordingly, dilute the incentives provided to equipment manufacturers to develop even better technologies. We believe this decision to be misguided particularly because, by all accounts, the Rules set here must govern these Bands for twenty or more years, and, as has never been clearer, technology can not, and should not, be frozen in time.

Securicor certainly agrees that the FCC should not adopt Rules that favor a particular manufacturer, and we ask here only that LM be given an opportunity to compete under fair competitive rules. In our view, the FCC's refarming rules should establish a level playing field for manufacturers. In other words, the FCC's rules should level the playing field, but not the technologies playing on the field. Indeed, the FCC has recognized for many years its mandate to promote spectrally-efficient technologies, as it is directed to do by the Communications Act. The technology-neutrality sought by the R&O must not abdicate this fundamental responsibility.

In practice, the band plans adopted by the R&O are not technology-neutral because they will inhibit at least one key advantage of LM and other 5 kHz technologies (including RZ-SSB), i.e., their spectrum efficiency. The costs of these lost efficiencies are substantial. Hatfield Associates, Inc.

("Hatfield"), a highly-respected and well-known international telecommunications consulting firm that has concluded that the R&O's decision to channelize the VHF and UHF Bands with less than the current state-of-the-art in technology will cost up to \$7.6 billion in Federal revenues foregone using the FCC's suggested valuation method,<sup>10</sup> will result in up to \$2.9 billion in lost infrastructure investment, and will result in 8,800 service jobs and 26,500 manufacturing jobs (person-years) foregone. The R&O simply has left too much on the table.

Securicor, accordingly, respectfully requests the FCC to reconsider the band plans established for the VHF and UHF Bands. A 5 kHz band plan, we believe, will not only help capture the lost efficiencies quantified in the Hatfield Report, but will also lead to a cleaner and easier transition to advanced technologies for the users in these Bands. This, in our view, can be accomplished with no loss of efficiencies for other existing technologies now contemplated by the R&O.

### **III. THE R&O'S BAND PLANS DO NOT MAXIMIZE SPECTRUM EFFICIENCY**

In its R&O the Commission ultimately selected band plans based upon 6.25 kHz channel bandwidth.<sup>11</sup> In structuring

---

<sup>10</sup>R&O at para. 138.

<sup>11</sup>In addition, the FCC elected to permit the aggregation of up to four NB channels to permit the use of wideband-equivalent technologies in these bands and has provided that existing users may remain on their 25 kHz or 30 kHz channels indefinitely and may even replace their equipment with 25 kHz or 30 kHz equipment type accepted prior to August 1, 1996. The FCC will address,

these plans, the FCC stated that "[t]his channeling plan establishes a channelization framework that is flexible, technology-neutral, and can easily be adapted to user fees or competitive bidding...." R&O at para. 7.

These conclusions are misplaced.

**A. The R&O Disfavors the Most Spectrally-Efficient Technologies**

In the R&O at para. 2, the FCC stated that "[w]e seek, in this proceeding, to ensure the provision of essential private wireless services, and to provide marketplace incentives to enhance spectrum efficiency so as to satisfy PLMR demand well into the 21st century." The Communications Act, indeed, directs the Commission to take action to "improve the efficiency of spectrum use"<sup>12</sup> in the PLMR Bands, to "encourage competition" in those Bands and, generally, to promote the introduction of new services and technologies.<sup>13</sup> The FCC, moreover, has acknowledged that "[a]pproval and indeed encouragement of efforts directed toward the development of new radio technologies is a statutory obligation of this Commission."<sup>14</sup>

---

however, the implementation of incentives to drive users to spectrally-efficient solutions for their needs in the Further Notice of Proposed Rule Making in this Docket.

<sup>12</sup> 47 U.S.C. § 332(a)(2).

<sup>13</sup> 47 U.S.C. §§ 7 & 332(a)(3).

<sup>14</sup> See In re Applications of Contemporary Communications Corporation, 98 F.C.C. 2d 1229 (1984) (applications for developmental authority to operate two-way stations in the 152 MHz band using amplitude compandored single sideband ("ACSB") 5-kHz channel narrowband technology).

The 7.5 kHz and 6.25 kHz channel spacings respectively in the VHF and UHF Bands are a poor fit for 5 kHz technologies, essentially wasting 2.5 kHz and 1.25 kHz for each system compared to a system employing 5 kHz technology. Channelization of the VHF and UHF Bands with 5 kHz band plans would result in an increased channel capacity of 50% and 25%, respectively, over that established in the R&O.<sup>15</sup> This translates into an effective loss of 2.77 MHz in the VHF Band and 3.11 MHz in the UHF 450-470 MHz Band, a total of 5.88 MHz of spectrum nationwide.<sup>16</sup> Hatfield estimates that based upon the existing users in these Bands, this lost capacity could otherwise serve 3.6 million users. Given the paramount objective of this proceeding of accommodating PLMR demand in these Bands well into the 21st century, this lost capacity comes at a high price.

Beyond even these costs, the R&O appears otherwise to generally disfavor the most spectrally-efficient technologies. To this end, the FCC has stressed that existing licensees in the PLMR Bands may continue their operations uninterrupted and has taken steps to minimize any disruption those licensees may

---

<sup>15</sup>The R&O expressly recognized that "[c]hannelizing at 5 kHz would provide a significant increase in the number of available channels and recognize the latest advancements in land mobile technology." R&O at para. 25.

<sup>16</sup>Furthermore, it is unlikely that a significant increase in communications capability will result from the intermediate step of halving the assignable bandwidth in the 450 MHz band and halving of the frequency assignments in the 150 MHz band. The offset channels of the 450 MHz band already have at least as many transmitters in the major metropolitan areas as do the primary channels.

experience if and when they change-out their systems for more advanced technologies. R&O at paras. 35-41. The Commission has also provided an opportunity for existing low power licensees on the 12.5 kHz offset channels in the 450-470 MHz Band an opportunity to upgrade their systems to high power, to remain on their existing frequencies on a secondary basis or to move to frequencies newly-designated as low power by the frequency coordinators. R&O at para. 65.

In contrast, the FCC has accorded harsh treatment to existing licensees operating 5 kHz systems on the 2.5 kHz and 7.5 kHz offsets in the VHF Band. These existing VHF offset licensees now operate the most spectrally-efficient equipment in the PLMR Bands subject to refarming and, as early adopters of this technology, have helped demonstrate the commercial feasibility of highly spectrally-efficient systems. Yet, the Commission has provided that these licensees -- many of whom have operated their systems for ten years -- may be subject to interference from operations on newly-authorized frequencies and that, even if no interference is experienced, these licensees must terminate their operations and move to new frequencies by August 1, 2001. R&O at para. 59. The FCC, in addition, will cease accepting applications for the 5 kHz offsets on August 18, 1995, the only applications that the Commission will no longer accept as a result of the R&O.

Finally, in establishing its ten year spectrum efficiency standards, the FCC stated that "we believe it is

reasonable to expect manufacturers to produce 6.25 kHz equipment in the refarming bands within ten years." R&O at para. 39. The FCC also established a ten year data standard of 4.8 kb/s. Thus, the standards for equipment in ten years' time do not meet today's state-of-the-art in spectrum efficiency.

Securicor respectfully urges the FCC to reconsider its views with respect to the ten year standard and to adopt a ten year spectrum efficiency standard or equivalent of 2.5 kHz and 7.2 kb/s per channel. We believe that it is essential to fulfilling the objectives of the refarming proceeding that the FCC provide equipment manufacturers the proper signals and incentives to continue investing in needed research and development. The ten year standard established in the R&O is, in our view, unduly conservative and will impel almost no investment by manufacturers in research and development activity. As a result, the expenditures of R&D funds with respect to the U.S. PLMR bands are likely to lag behind expenditures in other markets, and, in turn, U.S. competitiveness in global markets may well be impaired. And, of course, the introduction in the PLMR bands of even more spectrally-efficient equipment than the current state-of-the-art, which we believe is much nearer than ten years away, will be delayed, and the benefits to users and the U.S. economy of those new technologies postponed indefinitely.

**B. Technology Neutrality Must Not Override the Requirements of the Communications Act**

The "technological-neutrality" employed dispositively in favor of the 7.5 kHz and 6.25 kHz channel spacings can not override the fundamental goal set by the Communications Act of promoting spectrum efficiency. Securicor, of course, agrees that the refarming Rules should establish a level playing field for all parties competing in the equipment markets. But, on that level playing field, those technologies that excel should be allowed to emerge and be chosen by the marketplace. To this extent, the FCC's technological neutrality effects a leveling of 5 kHz technologies with 6.25 kHz technologies and thus in their effect are inconsistent with the FCC's obligation to promote spectrum efficiency.

**C. The R&O Is Not Technology-Neutral**

Even assuming that technological neutrality is otherwise consistent with the Communications Act, the band plans adopted by the R&O are not in fact technology neutral. As noted above, those band plans deprive the most spectrally-efficient technologies now available of their most critical competitive advantage, i.e., their spectrum efficiency. The R&O band plans therefore will inhibit the competitiveness of these technologies relative to less efficient technologies and can not be viewed as neutral.<sup>17</sup> Further, the ten year spectrum efficiency

---

<sup>17</sup>The FCC's rejection of a 2.5 kHz channelization plan was premised in part on the basis that because of "anticipated future trends ...we see no substantial benefit to such a channelization

standard established by the FCC will inhibit the ability of 5 kHz technologies to compete fairly in the refarmed PLMR bands indefinitely.

Of particular note, to the best knowledge of Securicor, no party who commented or otherwise participated in this proceeding stated any intention to deploy true 6.25 kHz narrowband equipment in the refarmed PLMR bands. The record is empty of any such references, and the R&O itself references no particular 6.25 kHz NB technology. Securicor is aware, of course, that several parties have indicated an intention to deploy 6.25 kHz wideband equivalent technologies in the refarmed PLMR bands. But, these wideband equivalent technologies are accommodated in the same manner by a 5 kHz band plan, i.e., through aggregation of channels, as by a 6.25 kHz band plan. Accordingly, the R&O's band plans appear to fit technology that is not even planned to be deployed in the PLMR bands at the expense of more spectrally-efficient equipment that is already deployed in the 220 MHz band.

**D. The R&O's Findings Regarding a 5 kHz Band Plan Are Flawed and Erroneous**

In rejecting a 5 kHz channelization plan, the FCC stated that a 5 kHz plan "would exclude traditional FM technologies and would be substantially narrower than channels

---

scheme." R&O at para. 25. The Commission did not further identify what these anticipated future trends were, but clearly appeared to imply by its statement that its decision was not in fact technology neutral.

employed by most mobile operations."<sup>18</sup> The FCC also held that "manufacturers of [narrowband] equipment acknowledge that it will be about three to five years before NB equipment with a full complement of features can be perfected in the refarming bands and made readily available to users " Id.<sup>19</sup>

At the outset, the FCC's first conclusion, that a 5 kHz band plan would "exclude" traditional FM technologies, appears to be a straightforward mathematical conclusion, i.e., that 12.5 kHz or 25 kHz transmissions will not fit in a 5 kHz bandwidth. The FCC made essentially the same finding with respect to the 7.5 kHz and 6.25 kHz channeling plans it ultimately adopted, apparently concluding that channel aggregation and out-of-channel licensing (i.e., 12.5 kHz systems licensed in 7.5 kHz or 6.25 kHz channels) significantly ameliorated the mathematical exclusion.

Channel aggregation in a 5 kHz band plan will also serve to accommodate 12.5 kHz or 25 kHz equipment. In the former case, a licensee must aggregate the same amount of spectrum, 15 kHz, to accommodate 12.5 kHz FM systems in the VHF Band as it would with the R&O's 7.5 kHz channel spacing. A licensee of 25 kHz FM systems would actually aggregate less spectrum (25 kHz)

---

<sup>18</sup>R&O at para. 25.

<sup>19</sup>The FCC also concluded that "channelizing at 2.5 kHz would provide the maximum number of channels, but in consideration of current technology and anticipated future trends, we see no substantial benefit to such a channelization scheme. Further, a 2.5 kHz channelization would create a burden on users, all of whom would have to aggregate multiple channels, and unduly complicate the frequency coordination process." R&O at para. 25.

with a 5 kHz band plan than with a 7.5 kHz band plan (30 kHz). In the UHF Band, a licensee would aggregate 2.5 kHz more spectrum with a 5 kHz band plan than with a 6.25 kHz band plan to operate 12.5 kHz equipment and the same amount of spectrum to operate 25 kHz equipment. Accordingly, any differences between the ability of a 5 kHz band plan and those adopted by the R&O to accommodate traditional FM systems are minimal and do not form an adequate basis to reject a 5 kHz band plan.

The FCC's suggestion that it rejected a 5 kHz band plan in part because it is substantially narrower than channels employed in most mobile operations (citing cellular, SMR and aeronautical mobile systems) appears to be an outright penalty for spectrum efficiency. Clearly, this is not consistent with the goals of this Docket.

Finally, Securicor does not concur that it will be three to five years before 5 kHz equipment with a full complement of features will be available in the refarmed bands. Indeed, much of the 5 kHz equipment that is deployed today in the 220 MHz band is directly and quickly translatable to the refarmed bands. SEA, Inc. has recently received type acceptance of a handheld portable in the 220 MHz band.<sup>20</sup> Securicor has completed development of VHF High Band systems and has already deployed them in the U.K. and Hungary. Securicor has received type-

---

<sup>20</sup>SEA received FCC type acceptance of its portable (FCC ID BZ6ESP700).

acceptance for equipment capable of 9.6 kbps data rate in a 5 kHz channel and anticipates that it will shortly request type-acceptance for an advanced 220 MHz LM handportable and other products.<sup>21</sup>

Beyond this, as noted above the record here is much less clear concerning the intentions of manufacturers to expeditiously deploy 6.25 kHz NB equipment in the refarmed PLMR bands. In Securicor's opinion, the existence of multiple and competing manufacturers with growing capacity to produce 5 kHz systems indeed is a principal strength of a 5 kHz band plan. And, in any event, the R&O failed to make any finding regarding the ability of manufacturers to deliver a full complement of products in the 6.25 kHz band plan.

#### **IV. A 5 kHz BAND PLAN WILL PROVIDE A SMOOTH TRANSITION TO ADVANCED TECHNOLOGIES IN THE PLMR BANDS**

The R&O (at para. 26) predicated its adoption of the 7.5/6.25 kHz band plans upon the flexibility that these plans provided in transitioning to a narrowband environment. In this respect, the FCC noted that its adopted band plans would enable (1) existing users to remain on their channel centers ("on-channel") through the transition to narrowband technology, and (2) would accommodate a layering of many different technologies

---

<sup>21</sup>The R&O provides no citation for its suggestion that manufacturers of NB equipment have "acknowledged" that it will be three to five years before NB equipment may be available in the refarmed bands. To the best of Securicor's knowledge, no manufacturer of 5 kHz equipment has made this statement, either in the record here or otherwise.

within the refarmed bands, including wideband equivalent technologies. The R&O did not directly address the capabilities of a 5 kHz band plan in these respects.

Figures 1 through 3 demonstrate the capabilities and flexibility of a 5 kHz band plan in ensuring a smooth transition to narrowband channelization in the VHF band. Figure 1 illustrates the migration of the VHF Band to 5 kHz channelization with an optional interim stage at 12.5 kHz. Notably, this migration path would permit all current licensees to remain on-channel through two change-outs of equipment, if that is what they desired. Figure 1 also depicts a channel plan with channel centers offset 2.5 kHz from existing centers to minimize interference to the existing licensees. Figure 2 illustrates this transition on-channel in a mixed technology environment. Figure 3 compares the 5 kHz band plan with that adopted by the R&O and demonstrates the gains in channel capacity possible with a 5 kHz plan.